

## FIN WITH A BLADE HAVING ADJUSTABLE CLOSED AREA

### FIELD OF THE INVENTION

5 The present invention relates to a fin with a blade having adjustable closed area, and more particularly to a fin with a blade having a closed area that may be freely adjusted for the blade to create desired propulsive force matching a diver's kick force.

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### BACKGROUND OF THE INVENTION

A fin includes a blade that has an expanded area to produce enhanced water-kicking ability and propulsive force, so  
15 as to help a user, that is, a diver, to quickly move forward under water.

Generally, a fin has given specification and size. The propulsive force that can be produced by a fin is  
20 determined by the hardness of the material used to make the fin and the water-kicking force produced by the diver. Generally speaking, a fin having a blade made of a harder material tends to produce larger propulsive force. However, the diver must be strong enough to exert more  
25 strength to kick water with the harder blade. On the other hand, a blade made of a softer material tends to

produce somewhat smaller propulsive force, and the diver may kick water with the softer blade without exerting too much strength. That means the diver may reserve more energy for swimming under water.

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The blade of a fin is typically a solid flat piece, and has a performance decided by the material used to make the fin. However, the same type fin might have different users, and the same user or diver might need different  
10 fins for different diving environments or water activities. A conventional fin has given hardness that could not be changed once the fin is produced. That is, the conventional fin is not adapted to different users or different use conditions because it could not be  
15 changed in the hardness thereof, and accordingly the propulsive force that may be produced by it.

To solve the above problems, a fin with a blade having a plurality of lengthwise channels is developed.  
20 Elongated inserts may be separately inserted into the channels, so that the blade may have an overall hardness and accordingly a propulsive force adjustable by the number of the elongated inserts inserted in the channels on the blade.

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The elongated inserts are separated from the fin and

normally disorderly scattered when they are not inserted in the channels on the blade, and are therefore easily getting lost. Particularly, these elongated inserts are not always available for use when they are normally  
5 scattered, and not conveniently portable when they are temporarily removed from the channels on the blade. Although the above-mentioned elongated inserts are useful in adjusting the hardness of the fin, they are not convenient for use.

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US Pat. No. 5,746,631 discloses a fin having a left and a right blade, most part of which are separated from each other. However, since the left and the right blade are always in the separated state, they do not have the  
15 function of providing an adjustable closed area thereof.

#### SUMMARY OF THE INVENTION

A primary object of the present invention is to provide  
20 a fin that includes a blade, which is lengthwise split into a plurality of sub-blades, so that the sub-blades are separated from one another from an outer end of the blade to a near central point of the blade; and at least one zipper, which is located between two adjacent  
25 sub-blades and adapted to zip up for the adjacent sub-blades to provide a closed area. The closed area

provided by the adjacent sub-blades is adjustable by zipping up the zipper by different length to thereby regulate a propulsive force created by the blade of the fin.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

The structure and the technical means adopted by the present invention to achieve the above and other objects  
10 can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

Fig. 1 is a top plan view of a fin with a blade having  
15 adjustable closed area according to the present invention;

Fig. 2 is a side view of the fin of Fig. 1;

20 Fig. 3 is a fragmentary perspective view of a zipper included in the fin of the present invention;

Fig. 4 is a top perspective view of Fig. 1;

25 Fig. 5 is an enlarged view of the circled area A of Fig. 4;

Fig. 6 is a fragmentary and enlarged plan view of the fin of the present invention showing the structure of the zipper at an outer end thereof;

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Fig. 7 is a cross sectional view taken along line B-B of Fig. 6 showing the engagement of a pull tab of the zipper with a pair of locating holes on the blade of the fin;

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Fig. 8 shows the first step of releasing the pull tab of the zipper from the locating holes on the blade of the fin;

15 Fig. 9 shows the second step of releasing the pull tab of the zipper from the locating holes on the blade of the fin; and

Fig. 10 shows the use of the fin of the present invention  
20 with the blade in a half closed state.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please refer to Figs. 1 and 2 that are top plan and side  
25 views, respectively, of a fin with a blade having adjustable closed area according to the present invention.

As shown, the fin mainly includes a blade 1, and at least one zipper 2.

The blade 1 is lengthwise split into a plurality of sub-blades, so that these sub-blades are separated from one another from an outer end 1a of the blade 1 to a near central point 1b of the blade 1 (also see Fig. 3). In the illustrated embodiment, the blade 1 is split into two sub-blades, namely, a left and a right sub-blade 11, 12. And, the following description is made based on a blade 1 having two sub-blades.

Please refer to Figs. 1 and 3-5, the zipper 2 is located between the adjacent left and right sub-blades 11, 12, and mainly includes two toothed zipper tapes 21 that may be closed to or separated from each other using a pull tab 22 connected to a slide of the zipper 2, and a plastic frame 23 sewed to two lateral sides and an inner end of the zipper tapes 21 with an outer periphery of the plastic frame 23 connected to the adjacent left and right sub-blades 11, 12.

The zipper 2 may be connected to the blade 1 in any suitable manner. For example, the zipper 2 may be positioned in a mold used to mold the blade 1, so that the plastic frame 23 of the zipper 2 is integrally connected to the adjacent

left and right sub-blades 11, 12.

To ensure firm and stable connection of the zipper 2 to the blade 1, tongue and groove joint may be designed  
5 between the plastic frame 23 and the blade 1. For example, as shown in Fig. 7, a flange 24 may be provided along the outer periphery of the plastic frame 23 of the zipper 2, and a groove 13 corresponding to the flange 24 may be provided along adjacent edges of the left and the right  
10 sub-blade 11, 12.

Moreover, the blade 1 is provided along the adjacent edges of the left and the right sub-blade 11, 12 at an outer side of the zipper 2 with locating mechanism C, so that  
15 the pull tab 22 having been pulled from the outer end 1a of the blade 1 to a desired position on the zipper 2 to partially or fully separate the left and the right sub-blade 11, 12 from each other may be held in place via the locating mechanism C and thereby keeps the two  
20 sub-blades 11, 12 in the separated state.

Figs. 6 and 7 clearly shows the engagement of the pull tab 22 with the locating mechanism C. As shown, the locating mechanism C includes a plurality of pairs of  
25 locating holes 14 provided along the adjacent edges of the left and the right sub-blade 11, 12 from the outer

end 1a of the blade 1 to the near central point 1b of the blade 1; and two substantially U-shaped holding ears 25 downward extended from two lateral sides of the pull tab 22. The U-shaped holding ears 25 are provided at  
5 respective lower outer wall surface with a shoulder portion 26 adapted to elastically engage with a lower edge of the locating hole 14, and thereby hold the pull tab 22 of the zipper 2 to a fixed position defined by one pair of locating holes 14. Once the pull tab 22 is  
10 engaged with one selected pair of locating holes 14 and held in place, the zipper 2 is stopped from opening or closing. Upper ends of the outer wall surfaces of the U-shaped holding ears 25 are formed into two pressing arms 27, which are normally upward projected from the  
15 locating holes 14 and easily accessible by a diver.

Please refer to Figs. 8 and 9. When it is desired to release the pull tab 22 from the locating holes 14, simply press the two pressing arms 27 toward each other to  
20 disengage the shoulder portions 26 from the lower edges of the locating holes 14, and then pull the pull tab 22 upward to completely separate the U-shaped holding ears 25 from the locating holes 14. At this point, the pull tab 22 may be pulled again to open or close the toothed  
25 zipper tapes 21 and be located at another desired pair of locating holes 14. Fig. 10 shows the zipper 2 on the



blade 1 of the fin of the present invention is pulled to half open the blade 1.

When the pull tab 22 is pulled forward from the near central point 1b toward the outer end 1a of the blade 1 and engaged with one selected pair of locating holes 14, portions of the two adjacent sub-blades 11, 12 behind the pull tab 22 are zippered up to produce a closed area 1C. By moving the pull tab 22 to different positions, the closed area 1C is adjusted to accordingly regulate a propulsive force that may be produced by the fin.

According to the present invention, the zipper 2 for regulating the propulsive force of the fin is integrally provided on the blade 1 without the risk of undesirably separating from the blade 1. What is most important is a user (diver) may adjust the zippered-up length of the zipper 2 and accordingly regulate the propulsive force of the fin at any time before or during diving, so as to enable kicking water in the most comfortable manner. That is, the fin of the present invention may be conveniently and quickly adjusted without the risk of scattered parts.